Murphy Creek project
general land use study

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B.C. HYDRO

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This impact assessment is based on the "Murphy Creek Project Engineering Description" prepared in November 1982. Since that time, ongoing planning and design studies have resulted in some changes that would affect the project description. The principal changes are as follows:

- In-service date has changed from 1993 to 1995.

- Installed capacity has changed from 300 MW to 275 MW.

- Small changes to the design and locations of shoreline protective works.

- Daily reservoir level fluctuations limited to 2.0 m during March, April and May (previously March and April).

The above changes have been incorporated in the report only where they would affect the results of the impact assessment.

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SUMMARY

The land use study focussed primarily on the aspects of the study area environment pertaining to the use of land for human settlement, including residential, recreation, institutional, industrial and commercial uses. The primary objective of the study was to assess the influence of changes due to the Murphy Creek Project from the point of view of:

- existing land use features;
- potential use of land;
- regional and local land use planning objectives;
- accommodation of demands for new development arising from the project.

This in turn sets the stage for making recommendations for mitigation of potentially adverse effects on the land resource, and recommendations for modifications and additions to regional and local planning and activities.

Those aspects of the Murphy Creek Project of importance to the land use studies included:

- elevation of reservoir and associated safeline;
- dam site, borrow areas, spoil areas, campsite, access roads, with emphasis on dam construction period;
- displacement of households directly affected by project;
- demand for new residences associated with project employment.

The study area extends from Hugh Keenleyside Dam along the Columbia River to the City of Trail. There are numerous communities dispersed along both sides of the Columbia River, including Castlegar, Balfour, Robson, Raspberry, Brilliant, Ootischenia, Blueberry/Fairview, Genelle/China Creek, Oasis, Rivervale, and Trail. The population of these communities range from 100 to 9,599, with the total population estimated to be approximately 20,800. With the exception of the Cities of Castlegar and Trail which serve as employment and service centers, each of the smaller communities are basically residential settlements.

Local and regional government administration is provided by three forms of government - City municipalities (Castlegar and Trail), Regional Districts (Central Kootenay and Kootenay Boundary) and Improvement Districts (provide water to most other smaller settlements). Planning and land use management activities are carried out by the municipalities and the Regional Districts. Both the City of Castlegar and the City of Trail have Official Community Plans in place, and the Regional District of Central Kootenay has completed the Castlegar Fringe Settlement Plan and the Lower Arrow Lakes Regional Plan for the unincorporated settlements in the north sector of the study area. Through the planning activities of these local and regional government agencies, areas to accommodate future demands for various forms of development have been identified. There is an ample supply of land within the study area to accommodate well in excess of projected demands for all forms of development in the foreseeable future. A common feature of all future development areas, however, is that major capital expenditures on services such as water, sewer and access roads would be required before development could take place. The communities with significant supplies of potentially developable land include Castlegar, Blueberry/Fairview, Robson, Ootischenia, and Trail.

The direct impacts of the project at the proposed El. 424m normal reservoir operating level would be concentrated on existing residential uses and to a lesser extent, parks and recreation areas. Impacts on commercial and industrial uses would be minimal.

In order to mitigate the adverse impacts associated with the project, a number of recommendations have been made. Several of these mitigation measures are considered essential, including the provision of protective works to stabilize banks, and remedial works to maintain all existing transportation linkages.

Specific measures to minimize the net displacement of households from the study area, as proposed in B.C. Hydro Report No. H1697 are recommended to be implemented. In Raspberry, mitigation measures should be taken to minimize the detrimental effects on the quality of the residential environment as a result of flooding of part of Pass Creek Park.

A further recommendation is that there should be no net loss of existing and potential parkland as a result of the project. Affected parklands should be replaced.

The demand for housing by inmigrant workers is anticipated to be approximately 54 units. This demand would be readily absorbed by the existing housing market.

The number of single family houses and mobile homes to be acquired or moved as a result of the project is estimated to be between 89 and 136 assuming all protective works proposed by B.C. Hydro are installed. These figures include an 80 unit mobile home park which will be inundated by the reservoir. The nature of the demand for new residences by the displaced households would be very complex and varied, taking into

consideration such factors as the replaceability of existing residences, lifestyle preferences, and relocation preferences. Assuming the market conditions found in 1983 continue to prevail by the end of the dam construction period, and that B.C. Hydro installs the proposed protective works, the demand by displaced households would be readily absorbed by the existing housing market.

Annual review of housing market conditions in the study area until the end of project construction is recommended. The review should include an examination of such factors as vacancy rates, number of homes for sale, condition of homes, price and location. Updated information on the capability of the housing market to absorb the Murphy Creek project housing demand will determine whether the recommendations made here require revision.

Development of a rental mobile home park would be required to replace the Whispering Pines Mobile Home Park. The preferred area for the new development would be in the Genelle area.

Recommendations regarding existing planning policy and activity modifications and additional planning policy and activity are outlined below:

- review of existing planning policy and implementation documents by respective jurisdiction to ensure that they are still current and reflect the associated impacts from the Murphy Creek Project.

- preparation of an Official Settlement Plan with specific development policies for the rural communities and surrounding lands between Trail and Blueberry Creek/Fairview.

- compensation by B.C. Hydro for necessary modifications to existing planning documents which are required due to changes in existing land use patterns as a result of the Murphy Creek Project.

1.1 ROLE OF LAND USE DISCIPLINE

In relation to the overall environmental impact assessment of the Murphy Creek Project, the land use discipline focussed primarily on those aspects of the study area environment pertaining to the use of land for human settlement, including residential, recreation, institutional, industrial, and commercial uses. Aspects of human settlement and land use taken into consideration included existing land use patterns, land status, land use planning, and development potential of land.

1.2 STUDY OBJECTIVES

The primary objective of the land use study was to assess the influence of changes due to the Murphy Creek project on the land base of the study area, from the point of view of:

- existing land use patterns
- regional and local land use planning objectives
- the accommodation of demands for new development arising from the project.

Part of the impact assessment involved identifying opportunities for mitigation of potentially adverse effects on the land resource. This in turn set the stage for evaluating possible mitigation and compensation measures from the point of view of appropriateness and compatibility with local and regional planning objectives.

1.2 STUDY OBJECTIVES (cont'd)

Secondary objectives detailed in the terms of reference are outlined as follows:

i) to provide inventory information presented in map form, relating to existing land use patterns, and existing land status (ownership, local government boundaries, and government and management reserves). This information was incorporated into the Environmental Studies Resource Atlas.[1]

ii) to provide information pertaining to the current "state" of land use planning in the study area, and an evaluation of implications for future land use in the area.

iii) to provide information relating to planned and proposed development or changes in land use in the study area.

iv) to evaluate vacant lands in areas which may be directly affected by the project in terms of suitability for various types of land use or development.

v) to evaluate the availability of developable lands in the study area to accommodate demands for new residential development arising from the displacement of households whose homesites are directly affected by the project as well as new employment on the project.

The land use study was not intended to duplicate the studies carried out by B.C. Hydro Properties Division[2 3] to determine the number and value of properties affected by the project at various reservoir elevations with and without protective works. Rather, the study was intended to complement the work of B.C. Hydro Properties Division by considering the impacts of the project from a broader perspective at the community and study area level.

1.3 ASPECTS OF PROJECT OF IMPORTANCE TO LAND USE STUDIES

Those aspects of the Murphy Creek Project of particular importance to the land use studies include:

i) location and elevation of reservoir and protective works, and associated safeline,

ii) changes to land use associated with borrow or spoil areas, construction campsite, access roads, and the dam with emphasis on the period of construction of the dam.

iii) displacement of households whose homesites would be acquired as a result of the project.

iv) demand for new residential development associated with project employment.

1.4 SCOPE OF STUDY

The main emphasis of this land use study was on residential, recreational, institutional, industrial and commercial uses in the communities of the study area. Other land uses would also likely be affected by the project and have been considered and evaluated by other studies, including:

- Canadian Pacific Railway facilities;
- highways and roads;
- municipal services and infrastructure;
- Inland Natural Gas facilities;
- West Kootenay Power and Light transmission lines;
- cultural facilities (e.g. Doukhobor Cemetery at Champion Creek);
- pulp mill at Castlegar.

1.5 STUDY PERSONNEL

The study personnel for the Land Use Study were Gordon Petersen, M.C.I.P., Senior Planner and Robert Goldie, M.C.I.P., Community Planner, of the consulting firm Urban Systems Ltd.

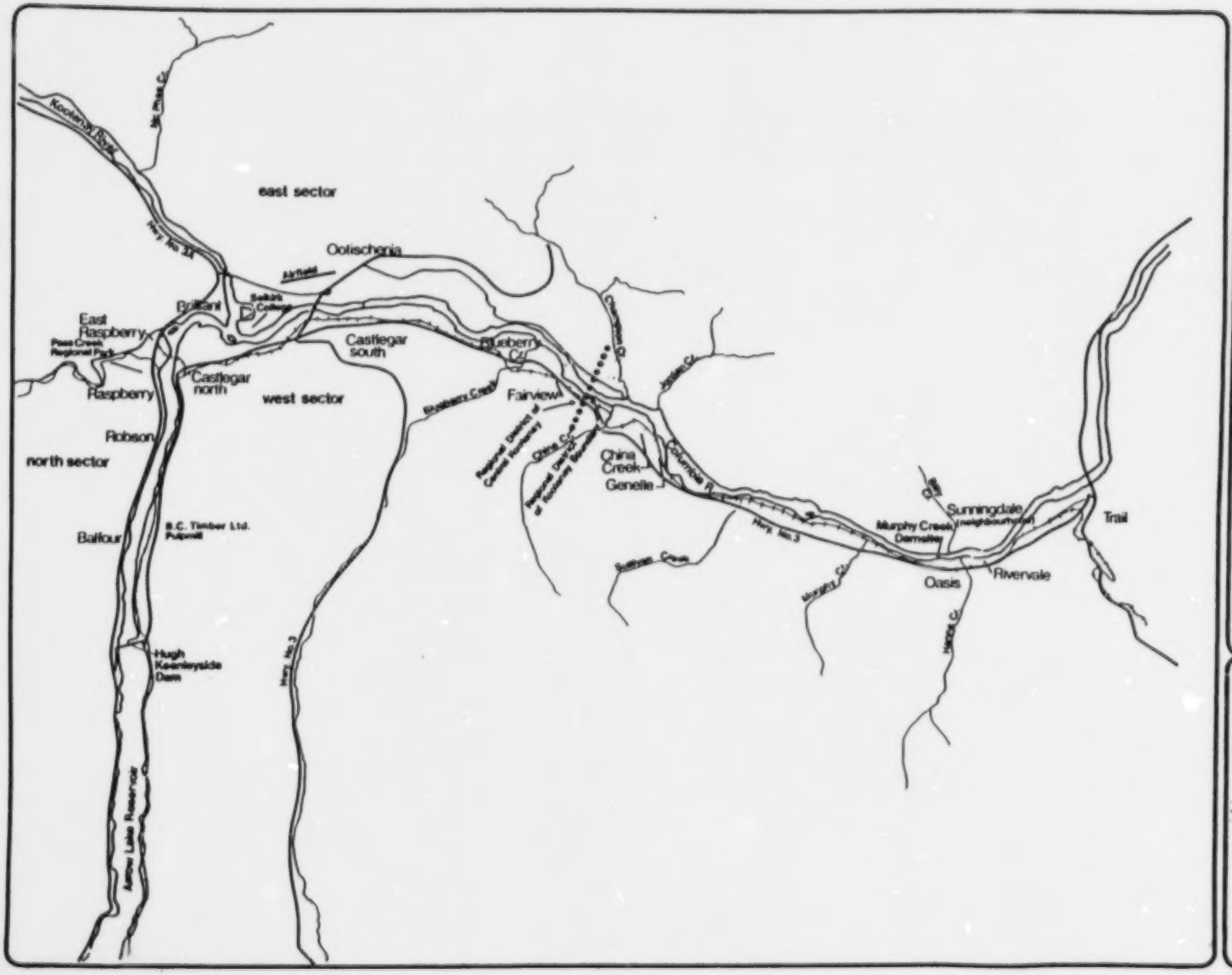
The following overview provides a general review of existing land use features, local government structure as well as local and regional land use planning activities in the study area, extending from Hugh Keenleyside Dam along the Columbia River to the City of Trail. Since existing features and development potential vary significantly throughout the study area, the overview is presented on a sub-area or sector basis. The locations of the communities in the study area are illustrated in Map 1.

2.1 REGIONAL DISTRICT OF CENTRAL KOOTENAY

As noted in Map 1, the Regional District of Central Kootenay encompasses that portion of the study area north of China Creek/Genelle.

2.1.1 Area Characteristics

This portion of the study area is developed rather extensively. Settlements include Castlegar, Blueberry Creek, Fairview, Balfour, Robson, Raspberry, Brilliant and Ootischenia. Other important land use features include the airport, Selkirk College, Hugh Keenleyside Dam, B.C. Timber Ltd. mill, several provincial highways, the ferry across the Columbia River between Castlegar North and Robson, and the Columbia River Bridge between Castlegar South and Ootischenia. This sub-area is naturally divided into three sectors by the Columbia River and the Kootenay River - the west sector, north sector and the east sector.



Murphy Creek Project

Environmental Studies Land Use Study

Study Area

map no. 1

date: October 1981

prepared for:
B.C. Hydro

prepared by:
urban systems ltd.

2.1.1 Area Characteristics (cont'd)

a) West Sector - the west sector is dominated by the City of Castlegar, a community with a population of 6900 in 1981, according to Statistics Canada. On a sub-regional basis, Castlegar is a major urban center with a stable economic base. In addition to having an important forestry industry (pulp mill and sawmill), Castlegar also serves as a sub-regional service center, providing retail, government and transportation services to a relatively large area surrounding Castlegar.

Two other smaller settlements in the west sector include Blueberry Creek (1976 Census population 660[5]), and Fairview (1976 Census Population 120 [5]). These two communities are located immediately south of Castlegar on the upper benchlands above the Columbia River.

b) North Sector - the existing settlements in the north sector include the following:

Settlement	Estimated Population [5] (1976)
Balfour Subdivision	150
Robson	1100
West Raspberry	260
East Raspberry	110
Brilliant	150
Total	1770

2.1.1 Area Characteristics (cont'd)

The communities are predominantly residential communities with a semi-rural character. In some areas, there are numerous pockets of vacant land (generally being used for orchards or other forms of agriculture) interspersed with the residences. Residents obtain employment throughout the region rather than within their own settlements. Community services, commercial and public, are generally obtained in Castlegar.

An additional important feature is Pass Creek Regional Park, located in a low-lying area between West Raspberry and East Raspberry. Although existing improvements in the park are limited, long range plans envisage development of a major regional park which would serve residents from all communities in the Castlegar sub-region.

Two important transportation linkages serving this area are Broadwater Road and the Ferry between Robson and Castlegar North. All development west of Pass Creek Park is dependent upon Broadwater Road for access.

c) East Sector - the only existing settlement in the east sector is Ootischenia (1976 Census population 570[5]), a large sparsely populated area with a rural character. Although most of Ootischenia is included in the Agricultural Land Reserve, commercial farming has not occured for many years. Other important land use features include the airport, Selkirk College, National Exhibition Center/ Doukhobor Historical Village, and the Castlegar and District Golf Course.

2.1.2 Local and Regional Government Structure

a) Regional Districts - The Regional District of Central Kootenay based in Nelson, has been very actively involved in providing planning services to all unincorporated areas within this sub-area. The Regional District has adopted the Lower Arrow Lake Regional Plan, the Castlegar Fringe Settlement Plan, and a Zoning Bylaw which cover the area within the Regional District outlined on Map No. 1.

Regional Districts have jurisdiction over the control of land use and management of new development in unincorporated areas, primarily by means of four devices - Official Regional Plans, Official Settlement Plans, Zoning Bylaws, and Subdivision Control Bylaws. In unincorporated areas, however, the final authority for approval of subdivisions is the Ministry of Transportation and Highways. Regional Districts as a general rule do not get involved in the provision and financing of infrastructure services to the same extent as municipalities. Roads are the responsibility of the Ministry of Transportation and Highways, and the provision of services such as water is generally carried out by Improvement Districts in the many unincorporated settlements in the area.

b) Municipalities - The only incorporated municipality in this sub-area is the City of Castlegar. Municipalities have jurisdiction over the control of land use and management of new development within municipal boundaries, primarily by means of three devices - the Official Community Plan, the Zoning Bylaw, and the Subdivision Control Bylaw. Municipalities also are responsible for the delivery and financing of a wide variety of municipal services, including transportation and roads, water, sewer, drainage, fire protection, police protection, recreation and general government.

2.1.2 Local and Regional Government Structure (cont'd)

c) Improvement Districts - Improvement Districts within this sub-area have been established at Robson, West Raspberry, Brilliant, Ootischenia, Blueberry Creek, and Fairview (Poupore Improvement District). Improvement Districts are distinct from municipalities and regional districts in that they have no jurisdiction over planning and land use control. Their sole function is to provide basic services to property, water being the most common.

2.1.3 Local and Regional Land Use Planning Activities

This section consists of a summary of the planning activities being carried out by the Regional District and the City of Castlegar, along with a brief overview of the contents of relevant planning documents with respect to the capability of the settlements to accommodate new development, taking into consideration the availability of land, servicing requirements, and planning policies. A number of Provincial Government agencies also have an involvement in the planning activities being carried out in the area, primarily by means of participation with the Regional District in the preparation of Official Regional Plans and Official Settlement Plans. These agencies include among others, the Ministry of Municipal Affairs, the Ministry of Transportation and Highways, the Ministry of Environment, the Ministry of Health, the Ministry of Agriculture and the B.C. Agricultural Land Commission.

West Sector

a) The City of Castlegar has an Official Community Plan[4], in which policies are outlined for the accommodation of future demands for new residential, commercial, industrial and public use development. According to the Community Plan, there is an ample supply of land to accommodate anticipated demands for all forms of new development in the foreseeable future. Although there is some room for infilling in existing development areas (multi-family

2.1.3 Local and Regional Land Use Planning Activities (cont'd)

a) West Sector (cont'd)

residential development and general commercial development), most new lower density residential development and industrial development will be located on vacant lands in new development areas. New residential development areas will generally be located on the benchlands to the west of existing development areas, and an industrial development area has been designated for the area in the south sector of Castlegar near Blueberry. Because these are new development areas, large capital expenditures to bring major trunk services (e.g. water, sewer, roads) will be required in order to accommodate new development.

In the Blueberry Creek/Fairview areas, there is land available to accommodate approximately 225 additional dwelling units on the vacant benchlands south of Blueberry Creek.[5] A preconditon to further development is the complete upgrading of the community water systems, including a new source of supply. In both the Lower Arrow Lakes Regional Plan[6] and the Castlegar Fringe Settlement Plan, the Blueberry Creek Fairview area is designated as a primary settlement area, subject to an improved source of water to serve increased development.

b) North Sector - The Robson and Raspberry communities together have been identified as a primary settlement area in both the Castlegar Fringe Settlement Plan and the Lower Arrow Lakes Regional Plan[6]. Extensive new development could be accommodated in Robson and Raspberry; significant expansion is contingent, however, upon provision of an improved water supply system, as well as the fiscal and engineering feasibility of a community sewerage system. An engineering assessment of water supply and wastewater for the Robson-Raspberry communities has been carried out.[7]

2.1.3 Local and Regional Land Use Planning Activities (cont'd)

b) North Sector (cont'd)

Although recognized in both the Castlegar Fringe Settlement Plan and the Lower Arrow Lakes Regional Plan as a primary settlement area, the community of Brilliant has only a limited potential for new development by means of infilling. [5]

c) East Sector - Ootischenia

Both the Castlegar Fringe Settlement Plan and the Lower Arrow Lakes Regional Plan[6], contain general policy statements stating that Ootischenia should be developed as a residential community with an agricultural orientation. Because of the complex nature of the area (existing land use and subdivision patterns, Agricultural Land Reserve, water needs for domestic and agricultural purposes, and the aspirations of local residents), Ootischenia is designated as a "Special Study Area" in the Regional Plan, implying that further detailed study is required prior to completion of an Official Settlement Plan. To this end, a detailed background planning study has been prepared[5] and the development options for Ootischenia are summarized as follows:

- little additional agriculture or housing development can occur without major improvements to the water supply and distribution system.
- with water system upgrading and subdivision to a minimum lot size of 0.8 ha. the number of dwelling units in the Ootischenia Improvement District could increase from 164 to about 408.
- with water system upgrading and subdivision to a minimum lot size of 0.4 ha., the number of dwelling units in the same area could increase from 164 to about 717.

2.2. REGIONAL DISTRICT OF KOOTENAY BOUNDARY

As noted in Map 1, the Regional District of Kootenay Boundary encompasses that portion of the study area south of the Regional District of Central Kootenay.

2.2.1 Area Characteristics

On the average, this portion of the study area is not developed as extensively as the Regional District of Central Kootenay portion. On the west side of the Columbia River, existing settlements include China Creek/Genelle, Oasis and Rivervale. On the east side of the river, there are no settlements. The City of Trail is located at the southerly end of the study area.

a) Communities on West Side of Columbia River

At the north edge of the Regional District, approximately 15 km north of Trail is the unincorporated community of Genelle - China Creek. The population of this residential community is estimated to be approximately 850.[8]* Some light industrial development has also recently taken place in Genelle. Further south approximately 5 km north of Trail is the small unincorporated residential community of Oasis, located west of the old Highway 22 which in turn lies west of the present Highway 22. The residential community of Rivervale is a settlement located approximately 4 km north of Trail on a bench between the Columbia River and Highway 22. The combined population of both communities is approximately 350 people.*

Residents generally obtain employment in Trail and surrounding area rather than within their own settlements. Community services, commercial and ppublic, are generally obtained in Trail.

* Regional District of Kootenay Boundary 1982 estimates.

2.2.1 Area Characteristics (cont'd)

b) City of Trail - The City of Trail is a community with a Census 1981 population of approximately 9,600. Trail is a major urban center in the region, with a stable economic base focused on the large Cominco smelter, refinery and fertilizer complex. Trail also serves as a service center (public services and private commercial services) for the many smaller communities located in the region.

2.2.2 Local and Regional Government Structure

a) Regional District - The Regional District of Kootenay Boundary is based in Trail. The jurisdiction and responsibilities of this Regional District are essentially the same as those outlined for the Regional District of Central Kootenay.

b) Municipalities - The only incorporated municipality in the sub-area is the City of Trail. The jurisdiction and responsibilities of Trail are the same as those outlined for the City of Castlegar.

c) Improvement Districts - Improvement Districts provide water services to the communities of Genelle-China Creek, and Rivervale.

2.2.3 Local and Regional Land Use Planning Activities

a) Communities on the West Side of Columbia River

No Official Settlement Plans have been prepared by the Regional District of Kootenay Boundary for the communities of Genelle-China Creek, Oasis, and Rivervale. In each of the communities however, there is very limited supply of vacant developable land, thereby severely limiting the capability of each of these communities to accommodate significant new development.

2.2.3 Local and Regional Land Use Planning Activities (cont'd)

However, as these communities, particularly Oasis and Rivervale are located near the dam site, they would be subjected to increased noise, traffic volumes, dust and potential short term land use conflicts which would necessitate further land use planning activities in the near future.

(b) City of Trail - The City of Trail has an Official Community Plan in place,[9] in which policies are outlined for the accommodation of future demands for new development. A number of future development areas have been designated, thereby ensuring an ample supply of land to accommodate new development in the foreseeable future. The most significant of these future development areas is the large benchland area (approximately 250 ha) north of the Sunningdale neighbourhood. Large capital expenditures to provide major services (water, sewer, alternate access road) would be required in order to accommodate new development. Therefore, without a major demand for new residential development in Trail, it is somewhat questionable as to whether it would be economically feasible for the City to expand into this potential development area in the foreseeable future.

IMPACT ASSESSMENT AND RECOMMENDATIONS FOR MITIGATION

SECTION 3

This section consists of a description of the project impact on land use caused by the El. 424m reservoir level and associated safeline as well as the dam, borrow spoil areas, campsite and access roads. In addition to a summary of the direct impacts of the El. 424m reservoir level on properties as provided by B.C. Hydro Properties Division [2,3], a description of the indirect impacts of the project on neighbourhoods, communities and the entire study area is provided. For the various impacts described, recommendations for mitigation which are considered to be realistic and appropriate are provided. The detailed impact assessment including recommendations for mitigation, is presented in Table 3.1. An overview of the project impacts follows Table 3.1.

In the assessment of direct impacts being carried out by B.C. Hydro Properties Division, projections have been made of the number of properties affected at the El. 424m reservoir level, with and without protective works.

The indirect impacts assocated with accommodating displaced households are addressed in Section 4.

B.C. Hydro estimates that about 605 ha of land would be directly affected by the project with protective works, with about 285 ha being directly inundated by the proposed reservoir.

TABLE 3.1
MURPHY CREEK PROJECT
LAND USE STUDY
IMPACT ASSESSMENT AND RECOMMENDATIONS FOR MITIGATION

LOCATION	PROJECT IMPACTS	RECOMMENDATIONS FOR MITIGATION	COMMENTS
Oasis	According to the consultant report "Assessment of Noise and Vibration from Construction"[12], the community of Oasis would be affected during the construction period by noise, dust, lights at night, traffic and a high level of activity. This in turn could have a detrimental effect on the quality of the residential environment of Oasis, as least in the short term.	Further investigation to determine the severity of the anticipated impact. If impacts are likely to be very severe, property acquisition is recommended.	
Rivervale	The dam site, located 1 km away, is visible from Rivervale. According to the above report, Rivervale would be affected during the construction period by lights at night, noise and a high level of activity. Although the impacts are not likely to be quite as severe as in Oasis, they could have a detrimental effect on the quality of the local residential environment.		

TABLE 3.1
MURPHY CREEK PROJECT
LAND USE STUDY
IMPACT ASSESSMENT AND RECOMMENDATIONS FOR MITIGATION

LOCATION	DIRECT IMPACTS[3] WITH PROTECTIVE WORKS	INDIRECT IMPACTS	RECOMMENDATIONS FOR MITIGATION	COMMENTS
Birchbank Park	Total submergence of park	This would be considered a significant reduction in the supply of parkland in the area, considering the extent to which the facility is used by Cominco employees.	Relocate park to an alternate suitable site and develop facilities.	Birchbank Park (approx. 1 ha.) is located on a low bench midway between Genelle and Oasis on the west side of the CPR tracks. The park is owned by Cominco and used by company staff for recreation and picnic functions.

TABLE 3.1
MURPHY CREEK PROJECT
LAND USE STUDY
IMPACT ASSESSMENT AND RECOMMENDATIONS FOR MITIGATION

LOCATION	DIRECT IMPACTS WITH PROTECTIVE WORKS	INDIRECT IMPACTS	RECOMMENDATIONS FOR MITIGATION	COMMENTS
Raspberry and Pass Creek Park	small portion of Pass Creek inundated	Clearing of trees and exposed mud flats during reservoir drawdowns would be visually unattractive.	- construction of protective work to prevent flooding of Pass Creek Park - investigate the feasibility of raising the level of the perimeter of the park and develop this area for park purposes including a perimeter of trees. Also investigate feasibility of maintaining water in pondage area during reservoir drawdowns to avoid unsightly mud flats.	The setting in which the existing residences at lower elevations in Raspberry are located is very attractive and unique in the study area. The attractiveness is attributed in large part to the presence and visibility of Pass Creek Park, even in its present undeveloped condition.
City of Castlegar	up to 35 homes acquired		- protective works recommended - investigate feasibility of raising existing houses such that displacement would not occur. If it is feasible, it would be far less disruptive than displacement.	The First Avenue area in South Castlegar which would be subject to flooding is a secluded, attractive neighbourhood composed of 20 relatively large, high quality homes adjacent to the river.
	submergence of vacant land suitable for park use	Development of vacant land as a community park to serve all of Castlegar would be precluded.	- investigate feasibility of raising level of land to create a riverfront community park.	

TABLE 3.1
MURPHY CREEK PROJECT
LAND USE STUDY
IMPACT ASSESSMENT AND RECOMMENDATIONS FOR MITIGATION

LOCATION	DIRECT IMPACTS[3] WITH PROTECTIVE WORKS	INDIRECT IMPACTS	RECOMMENDATIONS FOR MITIGATION	COMMENTS
Unorganized Areas (including Robson - Balfour, West and East Raspberry, Brilliant, Ootischenia	up to 21 homes acquired	Without protective works, the development potential of the benchlands south of Blueberry adjacent to the river would be limited.	- Investigate feasibility of raising existing houses such that displacement would not ocur. If it is feasible, it would be far less disruptive. - Protective works recommended at Blueberry.	
Fairview - Blueberry, Glenelle - China Creek, Oasis and Rivervale)	80 mobile homes relocated (Whispering Pines Mobile Home Park)	Loss of the mobile home park would have a significant impact on Genelle, in terms of ability to support commercial and public services (e.g. the concept of establishing Genelle as a municipality has been under consideration).	- Development of a new mobile home park in the Genelle area.	

Preliminary estimates by B.C. Hydro Properties Division are that 45 ha of land would have to be purchased by B.C. Hydro for direct use during and after dam construction (borrow pits, spoil areas, ancillary facilities, etc.). Preliminary layouts show these areas to be clustered in close proximity to the proposed dam site, with the construction camp (approximately 6.4 ha) being located just downstream of the dam, on the right bank, immediately upstream from Rivervale.

The impacts of the project fall largely on residential uses, with 56 single family homes and 80 mobile homes in the Whispering Pines Mobile Home Park being affected. B.C. Hydro is proposing to provide a range of options for owners of affected properties, and depending upon which option a property owner chooses, the number of properties which would have to be acquired varies between 9 and 56.

The other affected land use would be parks and recreational uses, including Birchbank Park, Pass Creek Park, and a potential park or recreational area in North Castlegar. The impact on commercial and industrial uses would be minimal.

The impact assessment demonstrates that in order to avoid disruption to the residential fabric of the study area, particularly in the City of Castlegar, protective works would be required. Also recommended is to investigate the feasibility of raising existing houses such that displacement would not occur. This method would be potentially less disruptive than relocation, and would serve to preserve the existing established neighbourhoods.

A review of the locations of potential borrow pits and spoil areas for the dam construction indicates that there would be a minimal impact from a land use perspective, though serious problems could arise in Oasis and Rivervale during the construction period, particularly with regards to noise, light, dust and traffic.

ACCOMMODATION OF DEMANDS FOR PROJECT RELATED RESIDENTIAL DEVELOPMENT SECTION 4

4.1 DEMAND

The demand for project related housing demand is derived from two sources - the inmigrant workers and households displaced as a result of the project.

Estimates of housing demand by inmigrant workers and the displaced households have been derived from information provided by D.P.A., the socio-economic consultants and by B.C. Hydro.[13] The estimated demands during the peak construction year are summarized as follows:

Source	Housing Demand*
Inmigrant Workers	54[11]
Displaced Households	89 - 136** [13]
Total	143 - 190

* assuming B.C. Hydro installs all proposed protective works.
** these numbers include the 80 mobile homes from Whispering Pines Mobile Home Park.

As the table illustrates, total housing demand would vary between 143 and 190 units provided the protective works proposed by B.C. Hydro are installed.

4.1.1 Housing Type

This demand can be analysed further. By using the housing split suggested by D.P.A.[11] the inmigrant housing demand can be broken out into demand for single family dwellings, apartments, and mobile homes. The split, according to D.P.A.[11], represents the figures found in Revelstoke labour force surveys regarding housing preferences, and are used here to give a general indication of a likely housing split. D.P.A. suggests that an even heavier preference for single family homes could be anticipated. This information is presented in the table below.

Housing Type	Inmigrant Workers	Displaced Households	Total
Single Family Dwelling	29	9 - 56	38 - 85
Apartment	7	0	7
Mobile Home (in a mobile home park)	18	80	98
TOTAL	54	89 - 136	143 - 190

The above table assumes that displaced households will choose to replace their existing housing with another unit of the same type. With this assumption, the demand for single family dwellings would be between 38 and 85 units. For apartments, the demand would be seven apartment units and for mobile homes (in mobile home parks), the demand would be 98 units.

There are several other factors which must be included in an assessment of replacement housing demand by displaced households, including:

1. The "replaceability" of existing homes. The homes to be acquired vary widely in terms of size, type, value, age, and quality. Even more significant in terms of replaceability is the setting or neighbourhood in which these existing homes are located. A common feature is that settings in which these homes are located are generally very attractive, and in many cases unique because of the surrounding natural features - e.g. river front, Pass Creek Park, etc. The settings differ, though, in other respects. Examples include:
   - urban residential in older, established neighbourhood - North Castlegar;
   - semi-rural residential - Raspberry, Robson, North Ootischenia, Genelle single family;
   - high quality, secluded, "estates" type areas - Castlegar south, part of Raspberry adjacent to Pass Creek Park;
   - mobile home residential - Genelle mobile home park.

2. Lifestyle preferences - it can be expected that the lifestyle preferences of the displacement households will vary widely, as exemplified by the widely varying circumstances in which they are presently living. In addition to personal preferences, other factors to be taken into consideration include the ages of household members, and household income (affordability of housing).

3. Relocation preferences - the homes to be acquired are widely dispersed throughout the study area. As demonstrated in the results of the household survey by the socio-economic consultants,[11] the relocation preferences of the displaced households surveyed indicated that most households would prefer close proximity to their existing place of residence. For instance, of the households surveyed in Genelle, no respondents indicated a preference to relocate to any areas north of Castlegar South. Similarly, of the households surveyed in Castlegar North, the large majority preferred to remain in Castlegar North, with no

respondents indicating a preference to relocate to any areas south of the City of Castlegar.

Taking into consideration the factors of replaceability, lifestyle preferences, and relocation preferences, it can be concluded that because of the widely varying circumstances and preferences of the displaced households, it is improbable that the expectations of all displaced households could be satisfied in any single residential neighbourhood created to accommodate housing demands associated with the project. A good variety of housing opportunities would be required.

4.2 SUPPLY

The following is a brief summary of existing vacancy rates in the study area and the availability of land throughout the study area to accommodate projected demands for residential development. Servicing requirements are also taken into consideration. However, it is not within the scope of this study to provide estimates of the costs of delivering these services. The potential residential development areas described are located above the El. 424m reservoir level safeline.

4.2.1 Available Housing Units

According to DPA the vacancy rate for rental accommodation units was 10% in the study area in 1982. Projections by D.P.A. suggest that the number of households in the Castlegar/Trail area would expand very little over the construction period. From this, D.P.A. estimates that vacancy rates will remain high for the project period, especially in relation to the small number of households requiring housing. [11]

4.2.2 Potential Development Areas

City of Castlegar - ample supply of land to accommodate well in excess of the entire anticipated demand for project related residential development. In the Official Community Plan, areas designated for residential development could accommodate 1200 single family dwelling units, 470 multi-family units, and 200 mobile homes. For single family and mobile home development, expansion would be into vacant development areas west of existing development areas. Extension of major trunk services (eg. water, sewer, roads) would be required. Development would be of an urban character with a full range of municipal services. These areas are located primarily on the benches in Southern Castlegar, and consist almost totally of privately-owned lands.

Blueberry/Fairview - supply of land on the vacant benches south of Blueberry could accommodate approximately 225 single family lots at an average lot size of 0.2 ha. A precondition to development in this area is a complete upgrading of the Blueberry water system, including a new source of supply. Development would be of a semi-rural character, with community services likely limited to a water system. Sewerage disposal would be on an individual basis. Onsite costs of servicing (that is services within the subdivision) would likely be somewhat less than those in an urban subdivision because of the lower level of services, although not significantly less since the lot sizes are much larger than in an urban subdivision. These areas are attractive, well-treed, with one bench being located adjacent to the river bank. The sites are privately owned.

Robson - with further subdivision in Robson, it is estimated that as many as 400 additional single family lots could be created,[5] subject to the upgrading of the water system, provision of a sanitary sewerage system and development of new internal roadway system. Access to Robson via Broadwater Road and the ferry to Castlegar North would also likely have to be improved significantly to accommodate this extent of new development.

Brilliant - very limited capability to accommodate new development.

Ootischenia - depending on the conclusions of an agricultural strategy study as to the feasibility of agricultural uses in Ootschenia (a study proposed by the Regional District), the Ootischenia area could have the capability to accommodate a large number of new single family dwellings in a development with a rural, or semi-rural character. This area would be of attraction to households with an interest in the keeping of animals and gardening. A precondition to accommodating further development is a complete upgrading of the community water system.

Genelle - According to a B.C.Hydro study[15] several locations in Genelle have been identified as being suitable to accommodate mobile home park development.

Oasis - not suitable as an area for new development.

Rivervale - no capability to accommodate new development.

Trail - capabilities to accommodate new residential development are largely associated with expansion into new development areas. As noted in Section 2 with respect to the large designated development area north of Sunningdale, unless there is a very significant demand for new residential development in this area (likely in the order of 200 dwelling units) it would not likely be economically feasible for the City or a private developer to extend major trunk services into this area.

The effective supply of land suitable to accommodate new development is largely concentrated in the northern sector of the study area at Blueberry/Fairview, Castlegar, Robson, and Ootischenia.

4.3 CONCLUSIONS

Based on the information presented in Sections 4.1 and 4.2, the following conclusions were reached.

1. It is assumed, based on conclusions reached by the socioeconomic consultants,[11] that the housing market conditions existing in 1982 would continue to prevail up to the end of the projection construction period. A cursory review of the housing market in December of 1983 showed that there was a 13% vacancy rate in apartments (based on a C.M.H.C. multi-family survey) and at least 300 - 325 single family homes listed with the Multiple Listings Service as being "for sale" in or near the study area. These findings support D.P.A.'s projection, and this conclusion.

2. All apartment housing demand would be absorbed by the existing housing market. Considering the estimated low demand (7 units), this is a reasonable conclusion.

3. The demand for mobile homes by inmigrant workers would be met by the existing mobile home park developments. The demand by inmigrant workers is expected to be low (18 units), and considering the number of mobile home parks in the area, should be readily absorbed.

4. The anticipated demand for single family housing units by inmigrant workers would be accommodated by the existing housing market. As the demand is projected to be around 29 units, the existing housing market should readily absorb this demand.

5. The anticipated demand for housing by displaced households would be accommodated by the existing housing market and through infill in existing developed areas, assuming 1982 market conditions continue, and all protective works proposed by B.C. Hydro are installed. Between the existing housing inventory and the potential for infill in existing developed areas, the demand for between 9 and 56 units should be accommodated.

6. The displacement of 80 mobile homes from the Whispering Pines Mobile Home Park would require the development of a similar number of spaces in the Genelle area. According to a B.C. Hydro study,[15] there are suitable locations within Genelle to provide for the relocation of park tenants.

4.4 RECOMMENDATIONS

1. Take whatever measures are necessary to minimize the net displacement of households. We recommend that proposals suggested in B.C. Hydro Report No. H1697 "Land Acquisition Report" be implemented. Conclusions reached in this report are based on the assumption that these protective works would be installed. Should these protective works not be installed, the conclusions and recommendations would have to be revised.

2. Development of a rental mobile home park would be required to replace the Whispering Pines Mobile Home Park. The preferred area of development would be in the Genelle area, to reduce the impact that the loss of 80 families would have on Genelle in terms of the area's ability to support commercial and public services.

3. Annually review housing market conditions in the study area until the end of the project construction period. The review should include an examination of such factors as vacancy rates, number of homes for sale, condition of homes, price and location. Updated information on the capability of the housing market to absorb the Murphy Creek Project housing demand would determine whether these recommendations require revision.

IMPACT ON PLANNING POLICIES AND ACTIVITIES SECTION 5

This section consists of a summary of the impacts of the Murphy Creek Project on present land use planning policies and activities, and examines the adequacy of existing policies and implementation bylaws to accommodate conditions brought about by the Murphy Creek Project. Recommendations on activities required to effectively respond to these changed conditions are also presented.

5.1 SUMMARY OF IMPACTS

5.1.1 Regional District of Central Kootenay

The Regional District has prepared an Official Regional Plan and an Official Settlement Plan for the area, and have a zoning bylaw in place. The official regional plan, entitled Lower Arrow Lake Regional Plan, and the official settlement plan entitled Castlegar Fringe Settlement Plan were both enacted in 1981, and were prepared with full awareness of the Murphy Creek Project and the Keenleyside Powerplant Project. Policies were prepared to address the anticipated growth resulting from both projects. There would be no conflict in general between existing OSP policies and the recommendations in this report.

5.1.2 City of Castlegar

The City of Castlegar adopted an Official Community Plan (OCP) in 1981, in which future demands for new residential, commercial, industrial and public uses were identified. Included in the OCP are references to

the Murphy Creek Project and potential impacts on residential development. The residential policies component of the plan set aside more than enough land to meet the needs of the anticipated increase in Castlegar's population due to the Murphy Creek Project, including a reference to the provision of land for those likely to be displaced. There would appear to be no conflicts in general between this report's recommendations and the OCP.

However, as in 5.1.1, the policies in the OCP are general in nature. There are a number of areas where more detailed planning would be required. In the Parks, Recreation and Institutional Policies section of the OCP, one of the Policies states that:

> If the Murphy Creek Project proceeds, steps shall be taken to ensure attractive useable waterfront areas, particularly to the east of the northern part of the City and in the Dumont Crescent area; in addition compensation shall be ensured where any areas of the community lose park and recreation lands to flooding as a result of theproject.

Planning involving the waterfront and the City's park system will have to be completed to fulfill this policy, and ensure a comprehensive and effective open space network in Castlegar.

5.1.3 Regional District of Kootenay Boundary

The Regional District has as yet not finalized any policies or plans for those portions of the regional district within the study area. An Official Settlement Plan is currently being written for that portion of the study area east of the Columbia River. However, an official settlement plan for areas west of the Columbia River is not being prepared; an area which includes the rural communities of Oasis, Rivervale, and China Creek/Genelle. As much of the land use impacts

from the Murphy Creek Project, particularly those associated with the construction site and camp, will be felt by these communities, planning should be conducted at both the regional and local levels to reduce potential impacts and allow for orderly planned development. An Official Settlement Plan is required addressing the following factors:

- impact during construction on Oasis, Rivervale, and adjacent rural areas;
- long term impact on China Creek/Genelle;
- implications of new reservoir above the dame, in terms of shoreline development, and, in particular new recreational opportunities.

5.1.4 City of Trail

The City of Trail adopted an Official Community Plan in 1980, in which policies are outlined for the future accommodation of new development. However, residential development resulting from Murphy Creek Project would be limited to infilling in existing residential areas. As such, the Murphy Creek Project should not cause conflicts with existing residential policies.

Under the title "General Community Concerns", policy No. 6 states that the possible adverse environmental effects of the Murphy Creek Project should be evaluated. This implies a study be conducted by the City of Trail on the associated impacts upon Trail of the project. In addition, under the transportation policies section, policy no. 8 states that B.C. Hydro shall be requested to consider the construction of a river crossing as part of the proposed dam structure.

5.2 RECOMMENDATIONS

1. All existing plans and bylaw should be reviewed by the respective jurisdictions to ensure that the existing policies and development strategies are still current and accurately reflect the associated impacts from Murphy Creek Project. As many existing plans and bylaws were written taking into account the Murphy Creek Project, the review will amount to a fine-tuning of existing policies and development requirements. In many respects, the Murphy Creek Project had not been finalized when these planning documents were written, in particular the final reservoir level, the number of displaced households, amount of inundated lands, and the location of the construction camp and ancillary facilities. These will have to be incorporated into existing planning documents, and may result in some changes to existing policy.

2. The Regional District of Kootenay Boundary should prepare a detailed settlement plan for the rural communities and surrounding lands between Trail and the northern boundary of the Regional District.

3. B.C. Hydro should consider compensation for necessary modifications to existing planning documents which are required due to changes in existing land use patterns as a result of the Murphy Creek Project.

CONCLUSIONS AND RECOMMENDATIONS
SECTION 6

The following is a list of the conclusions and recommendations contained in the main body of the report.

6.1 CONCLUSIONS

1. The direct impacts of the project would be concentrated on existing residential development areas, and to a lesser extent on parks and recreation areas. Existing commercial uses would generally not be directiy affected. Direct impacts on existing and potential industrial developments would be minimal.

2. The direct impacts of the project would be concentrated in the communities of China Creek/Genelle, Castlegar, Robson/Raspberry, and Blueberry. Oasis and Rivervale may be detrimentally affected during the dam construction period.

3. The demand for project related residential development within the study area would be made up of two components - demand by inmigrant workers and demand by displaced households. Total demands are estimated as follows:

Housing Type	Inmigrant Workers	Displaced Households
Single Family Dwellings	29	9 - 56
Apartments	7	0
Mobile Homes (in mobile home parks)	18	80
Total	54	89 - 136

4. The nature of the demand for new residences to accommodate displaced households would be vary complex and varied, taking into consideration such factors as the replaceability of existing residences, lifestyle preferences and relocation preference.

5. It is assumed, based on conclusions reached by the socio-economic consultants,[11] that the housing market conditions existing in 1982 would continue to prevail up to the end of the projection construction period. A cursory review of the housing market in December of 1983 showed that there was a 13% vacancy rate in apartments (based on a C.M.H.C. multi-family survey) and at least 300 - 325 single family homes listed with the Multiple Listings Service as being "for sale" in or near the study area. These findings support D.P.A.'s projection, and this conclusion.

6. All apartment housing demand would be absorbed by the existing housing market. Considering the estimated low demand (7 units), this is a reasonable conclusion.

7. The demand for mobile homes by inmigrant workers would be met by the existing mobile home park developments. The demand by inmigrant workers is expected to be low (18 units), and considering the number of mobile home parks in the area, should be readily absorbed.

8. The anticipated demand for single family housing units by inmigrant workers would be accommodated by the existing housing market. As the demand is projected to be around 29 units, the existing housing market should readily absorb this demand.

9. The anticipated demand for housing by displaced households would be accommodated by the existing housing market and through infill in existing developed areas, assuming 1982 market conditions continue, and all protective works proposed by B.C. Hydro are installed. Between the existing housing inventory and the potential for infill in existing developed areas, the demand for between 9 and 56 units should be accommodated.

10. There is an ample supply of potentially developable land within communities in the study area to accommodate well in excess of the project related residential demands.

6.2 RECOMMENDATIONS

1. Protective works to stabilize banks are recommended.

2. Remedial works to maintain all existing transportation linkages (Arrow Lakes Drive, Ferry, and Broadwater Road) are essential.

3. Take whatever measures are necessary to minimize the net displacement of households. It is recommended that the proposals suggested by B.C. Hydro in the Land Acquisition Report (No. H1697) be implemented. Conclusions reached in this report are based on the assumption that these protective works would be installed. Should these protective works not be installed, the conclusions and recommendations in this study would have to be revised.

4. Development of a rental mobile home park would be required to replace the Whispering Pines Mobile Home Park. The preferred area of development would be in the Genelle area, to reduce the impact that the loss of 80 families would have on Genelle in terms of the area's ability to support commercial and public services.

5. Annually review housing market conditions in the study area until the end of the project construction period. The review should include an examination of such factors as vacancy rates, number of homes for sale, condition of homes, price and location. Updated information on the capability of the housing market to absorb the Murphy Creek Project housing demand would determine whether these recommendations require revision.

6. In Raspberry, take all measures possible to minimize the detrimental effects on the quality of the residential environment as a result of flooding of part of Pass Creek Park (i.e. aesthetic impact of clearing of trees and exposed mud flats during reservoir drawdowns).

7. Lost existing and potential parkland should be replaced. Existing and potential park areas affected would be the Pass Creek Regional Park, Birchbank Park, as well as the adjacent vacant area with potential for park development in the north-east sector of Castlegar. Further investigation would be required to identify appropriate locations for replacement of these facilities.

8. All existing plans and bylaws should be reviewed by the respective jurisdictions to ensure that the existing policies and development strategies are still current and accurately reflect the associated impacts from the Murphy Creek Project.

9. The Regional District of Kootenay Boundary should prepare a detailed settlement plan for the rural communities and surrounding areas.

10. B.C. Hydro should consider compensation for necessary modifications to existing planning documents which are required due to changes in existing land use patterns as a result of the Murphy Creek Project.

REFERENCES

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2 Properties Division, British Columbia Hydro and Power Authority, May 1979, Murphy Creek Generation Development Studies, Stage II, Properties Study and Recommendations.

3 Properties Division, British Columbia Hydro and Power Authority, 31 January 1981, Murphy Creek Reservoir Report.

4 City of Castlegar, Official Community Plan, February 1981.

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6 Regional District of Central Kootenay, Official Regional Plan for Arrow Lakes Region, 1981.

7 Kerr Wood Leidel Associates Ltd. January 1981, Report on Water Supply and Wastewater for the Robson-Raspberry Region.

8 Kerr Wood Leidel Associates Ltd., February 1981, Phase I Study - Impact of the Murphy Creek Hydroelectric Dam on Municipal Services in the Castlegar Region.

9 City of Trail, December 1980, Official Community Plan.

10 B.C. Hydro Hydroelectric Generation Projects Division, March 1981, Columbia River Murphy Creek Project, Feasibility Study, March 1981. Report No. H1335.

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12 Harford, Kennedy, Wakefield Ltd. November 15, 1982, Murphy Creek Hydroelectric Project: Assessment of Noise and Vibration from Construction.

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15 B.C. Hydro Murphy Creek Project, Whispering Pines Mobile Home Park Study.

REFERENCES (cont'd)

16 Thurber Consultants Ltd., June 1982, Murphy Creek Hydroelectric Development Impact on Existing CP Rail Facilities - Draft.

17 Bowman Engineering Associates Ltd., September, 1982, Murphy Creek Project - Camp and Office Development Study - Preliminary Design Report.

18 Dayton & Knight, June 1982, Murphy Creek Project Phase II - Municipal Studies.

APPENDIX A

TERMS OF REFERENCE

LAND USE.

The land use study is intended to integrate information on settlement plans, resource capability, and public and private land status. The focus of the study is on possible impacts to zoning and land development plans of communities, regional districts, and resource agencies. The information will subsequently be referred to by B.C. Hydro and other parties in developing mitigation and compensation proposals, designing possible relocation projects, and amending plans.

The local study area consists of the Columbia valley between Keenleyside Dam and Trail (inclusive) up to an elevation of 500 m.

Much information on resource capabilities, land uses, and socio-economic conditions is contained in other reports by consultants or by B.C. Hydro engineering and properties staff. Contact with outside agencies will be required for most planning information. All such contacts should be coordinated with B.C. Hydro Community Relations Program.

INVENTORY:

1. Prepare a 1:10,000 land use map (base mosaics to be supplied; final drafting by Resource Atlas Specialist) for the study area, depicting:

   - existing land use patterns and features
   - government reserves, management areas or other areas with special management status
   - planned and proposed developments or management areas
   - jurisdictional boundaries
   - zoning (e.g. residential, commercial, industrial, recreational, transportation and utility, flood plain).

Cont./Page 2.

2. Describe any relevant planning policies and schedules of land development by planning and resource agencies at the provincial, regional, district and local government levels.

ASSESSMENT:

1. Describe the project impact on the present and planned use of land, both public and private, caused by the reservoir and associated safeline, takeline, borrow areas, access roads, dam, and other project works.

2. Estimate areas of high resource values, developable land, and land of various settlement zones, which would be lost or remain with the project.

3. Using population and economic forecasts in other reports, and B.C. Hydro studies of the people and facilities to be relocated, comment on the adequacy of present plans, zones, policies, and schedules as to how they could accommodate the changed conditions brought about by the project.

4. Discuss land available for housing in context of housing demand predicted by socio-economic consultant.

POOR

QUALITY

ORIGINAL